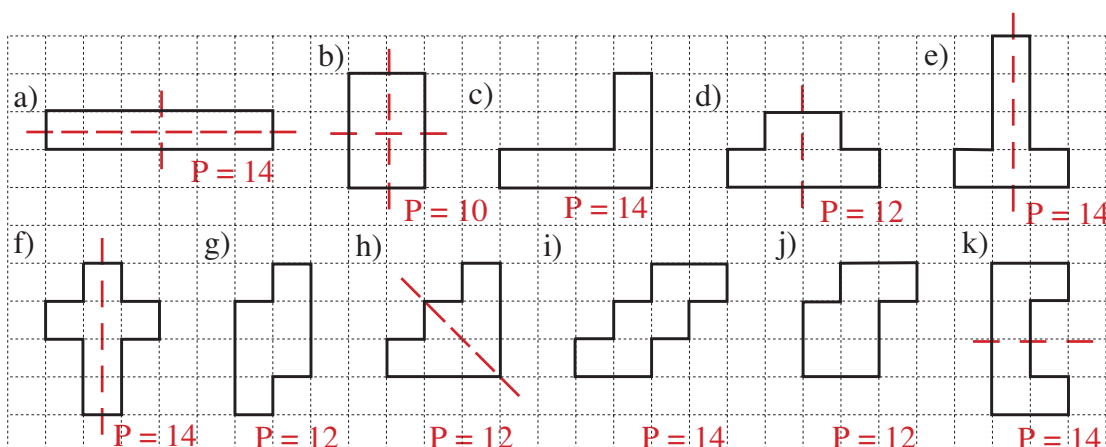
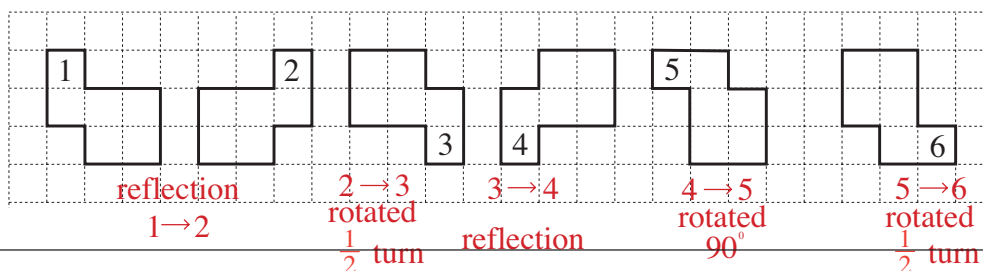


1

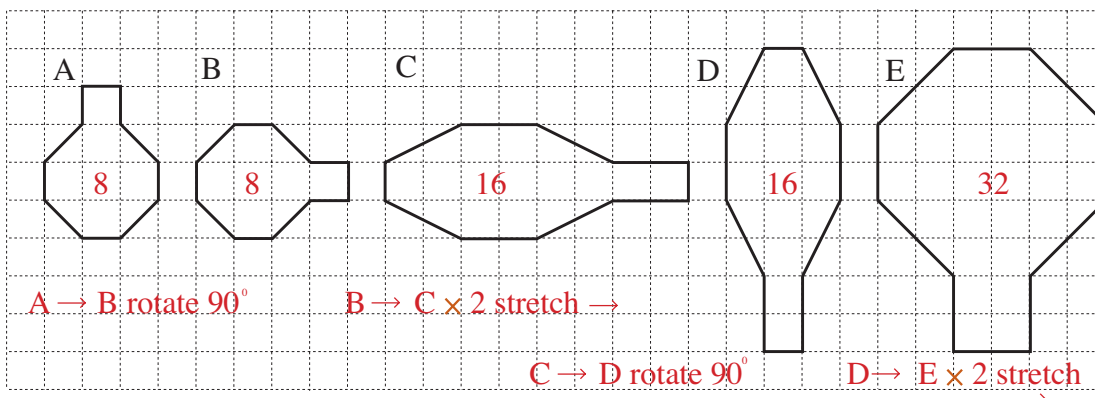
- i) Colour the shapes which are **symmetrical** and draw the **lines of symmetry**.
 ii) Write the perimeter length (in grid units) below each shape .

2

These shapes are **congruent**. What has been done to *Shape 1* to make *Shape 2*, *Shape 2* to make *Shape 3*, and so on? Write it in your exercise book.

**3**

What has been done to *Shape A* to make *Shape B*, *Shape B* to make *Shape C*, and so on? Write it in your exercise book.

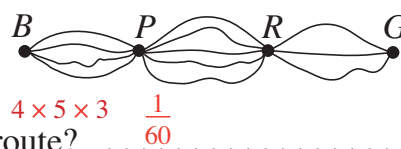


Write the area inside each shape.

4

Barry Bear is planning his route to visit *Piggy*, then *Rabbit*, then *Goat*.

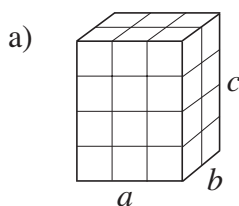
He draws the possible paths he could take.



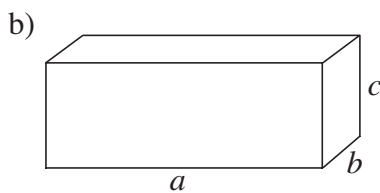
- a) How many routes are possible? 60
 $4 \times 5 \times 3 = \frac{1}{60}$
 b) What chance has *Goat* of guessing *Barry's* route? $\frac{1}{60}$

1

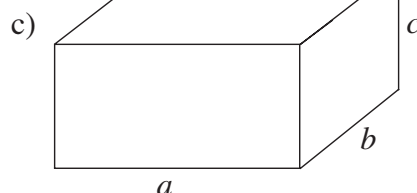
How many unit cubes are needed to build each cuboid?



$a = 3$ units
 $b = 2$ units
 $c = 4$ units



$a = 8$ units
 $b = 2$ units
 $c = 8$ units



$a = 6$ units
 $b = 4$ units
 $c = 8$ units

..... 24

..... 128

..... 192

Colour the cubes which are **similar**.**2**

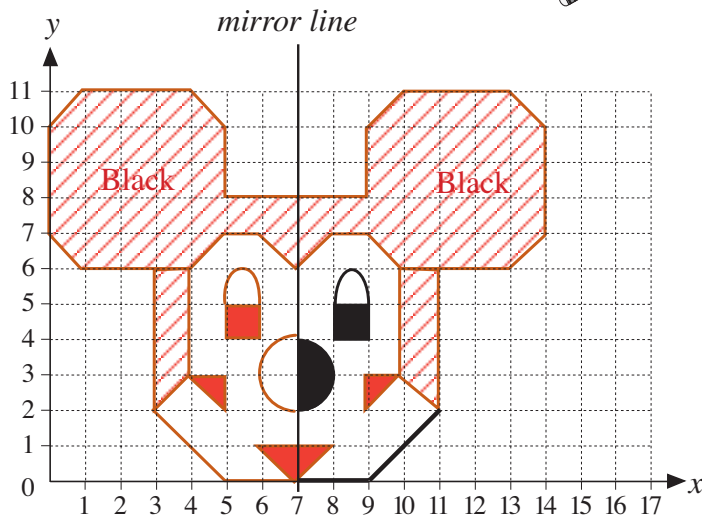
Find the points and join them up. Colour the shapes you make.

Colour this shape *black*.

(7, 8), (5, 8), (5, 10),
 (4, 11), (1, 11), (0, 10),
 (0, 7), (1, 6), (3, 6),
 (3, 2), (4, 3), (4, 6),
 (5, 7), (6, 7), (7, 6), (7, 8)

Colour this shape *red*.

(9, 2), (9, 3), (10, 3), (9, 2),
 (7, 0), (7, 1), (8, 1), (7, 0)

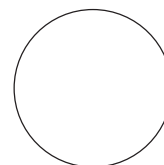
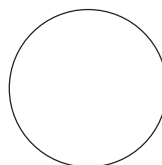
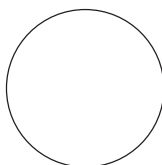
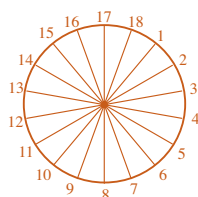
**Reflect** all the shapes drawn and already given in the *mirror line*.**3**

A group of children are standing in a circle to play a game. Each child has been given a number in order round the circle.

If the child numbered 6 stands opposite the child numbered 15, how many children are playing the game?

18

Trials:

**4**The *Rabbit* family grow their yearly supply of carrots in a rectangular garden. Its area is 180 m^2 . How long is the garden if it is 15 m wide?

12 m

1

Snow White is painting a picture of the seven dwarfs.

The area of the rectangular canvas is 4500 cm^2 .

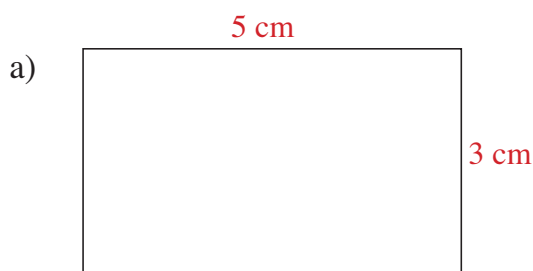
How long is the canvas if its width is 500 mm?

$$A = 4500 \text{ cm}^2 \quad 500 \text{ mm}$$

Answer: **90 cm**

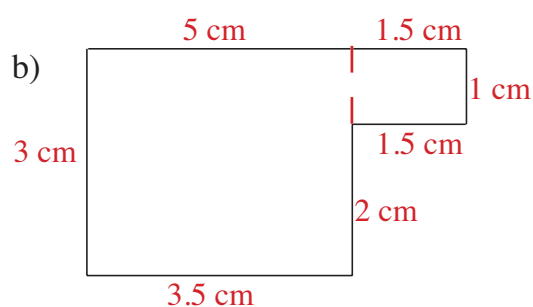
2

Measure the sides of each polygon. Calculate the perimeter and the area.



$$P = 2(5 + 3) = 16 \text{ cm}$$

$$A = 5 \times 3 = 15 \text{ cm}^2$$

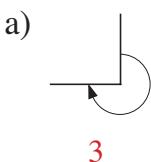


$$P = 16 \text{ cm}$$

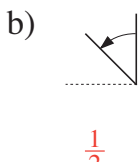
$$A = (3.5 \times 3) + (1.5 \times 1) = 12 \text{ cm}^2$$

3

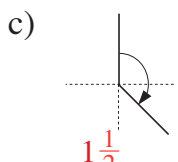
How many **right angles** are the angles shown by the arrows?



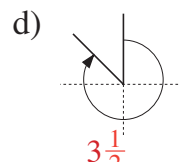
3



$\frac{1}{2}$



$1\frac{1}{2}$

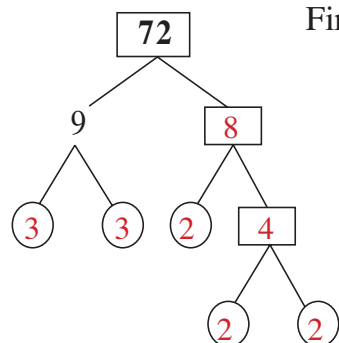


$3\frac{1}{2}$

4

A cuboid is built from 72 unit cubes. How many units long can the edges be?

First factorise 72, then show the possibilities in the table.

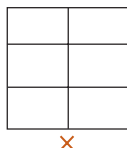


<i>a</i>	1	1	1	1	1	1	2	2	2	2	3	3
<i>b</i>	1	2	3	4	6	8	2	3	4	6	3	4
<i>c</i>	72	36	24	18	12	9	18	12	9	6	8	6

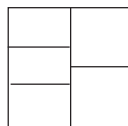
5

Try to divide a square into 6 smaller squares.

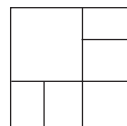
Trials:



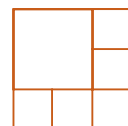
x



x



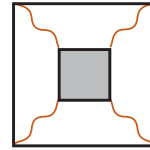
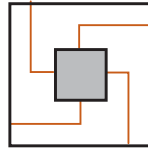
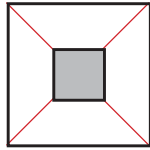
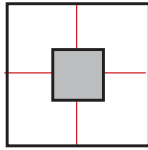
x



✓

1

The diagram shows the plan of a house in the middle of its garden. Divide up the garden into 4 congruent parts in different ways.



2

The perimeter of a triangle is 10 units.
It has two equal sides. The length of each side is whole units.
What is the length of each side?

Answer: *3, 3, 4 or 4, 4, 2*

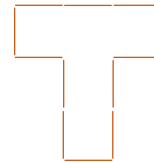
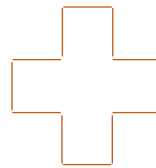
3

The diagram shows a 5-unit shape made from 12 equal sticks.

E.g:



Make another shape with 12 equal sticks which also has an area of 5 units.



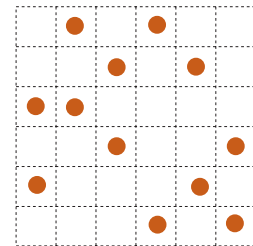
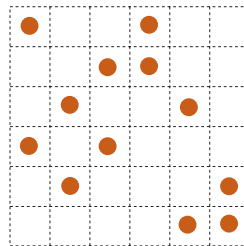
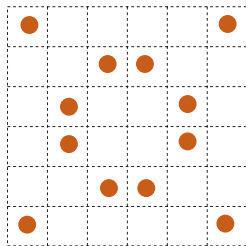
Draw it here.

4

Draw 12 dots on a 6×6 grid so that there are exactly 2 dots in each row, column and diagonal.

E.g:

Trials:



5

Six goblins live in 6 rooms, one goblin in each room.

Make another plan of six congruent rooms but using 1 less stick.



13 sticks

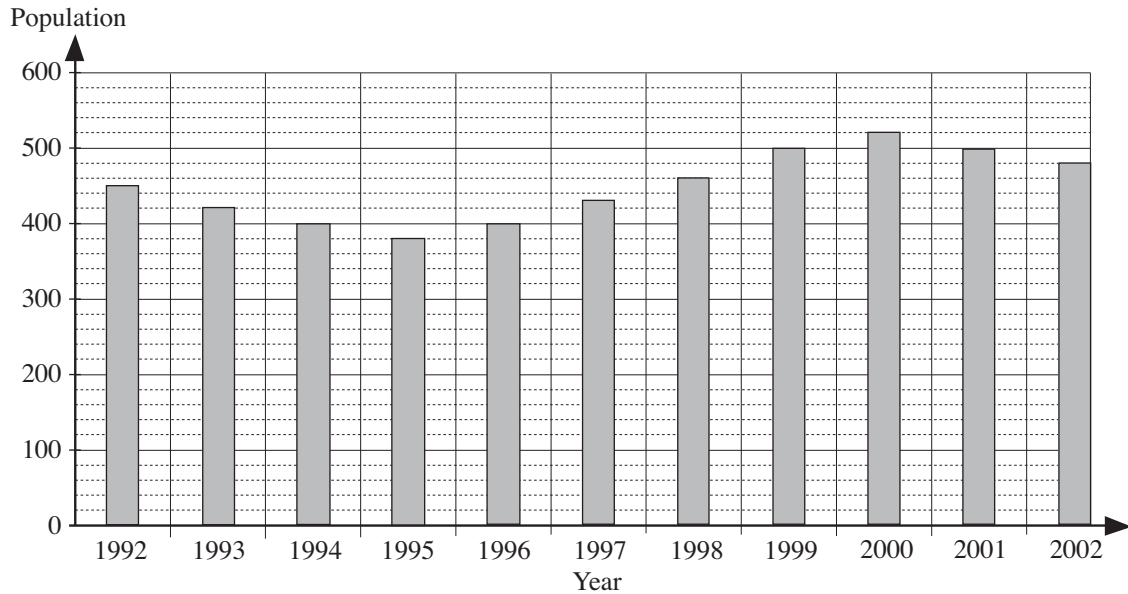
Draw it here. E.g:



12 sticks

1

This graph shows how many people lived in *Bananaville* on the 1st of January in the years given.



a) Collect the data from the graph and write it in this table.

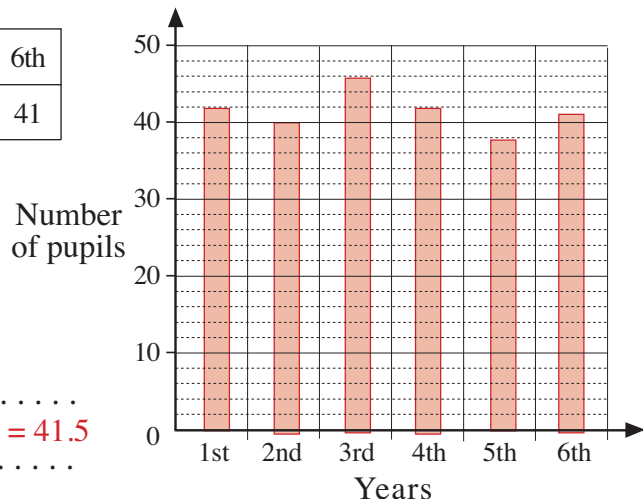
Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Population	450	420	400	380	400	430	460	500	520	500	480

- b) i) When was the population highest? **2000**
- ii) When was the population 500? **1999 and 2001**
- iii) When was the population increasing? **1995 to 2000**
- c) i) Write the population numbers in increasing order.
 **380, 400, 400, 420, 430, 450, 460, 480, 500, 500, 520,**
- ii) Which number is the **median** (in the middle)? **450**

2

The table shows the number of pupils in the different years in a school.

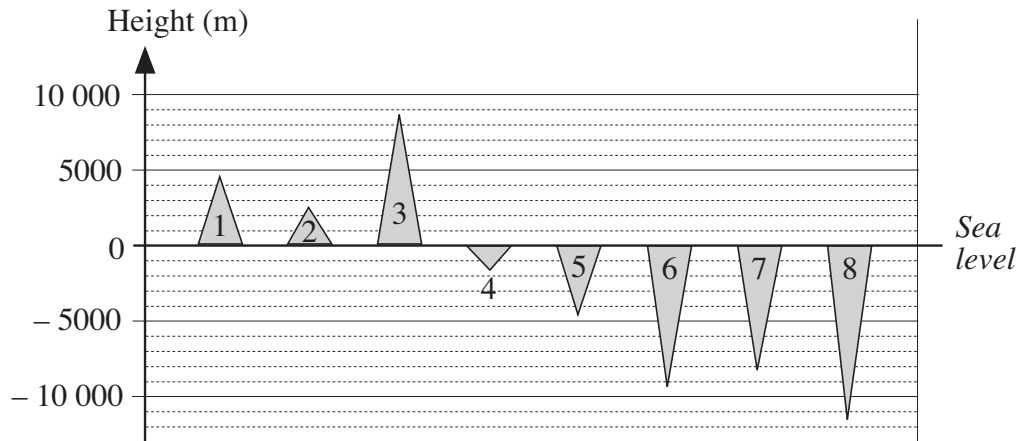
Year	1st	2nd	3rd	4th	5th	6th
No. of pupils	42	40	46	42	38	41



- a) Show the data in the graph.
- b) Write the pupil numbers in increasing order.
38, 40, 41, 42, 42, 46
- c) What is the **median**? $\frac{41 + 42}{2} = 41.5$

1

This graph shows the highest point of some mountain ranges and the deepest point of some seas. Read the graph and fill in the **approximate** missing values.



- | | | | | | | | |
|-----------------|---|---|---|--------------------|---|--|---|
| 1. Alps | ≈ | 4900 | m | 5. Mediterrean Sea | ≈ | - 4600 | m |
| 2. Carpathians | ≈ | 2500 | m | 6. Atlantic Ocean | ≈ | - 9200 | m |
| 3. Himalayas | ≈ | 8900 | m | 7. Indian Ocean | ≈ | - 8100 | m |
| 4. Adriatic Sea | ≈ | -1500 | m | 8. Pacific Ocean | ≈ | -11600 | m |

- a) Which is higher, the Alps or the Carpathian Mountains? Alps
- b) Which sea is deeper, the Mediterranean or the Adriatic? Mediterranean
- c) What is the difference between the highest mountain and the deepest sea?
20 500 m

2

= 150 acorns

How many acorns did the *Squirrel* family collect each day? Complete the diagram.

Monday:		$5 \times 150 =$ 750	750
Tuesday:		$4 \times 150 =$	600
Wednesday:		$5 \times 150 + 75 =$	825
Thursday:		$3 \times 150 =$	450
Friday:		$4 \times 150 + 75 =$	675
Saturday:		$3 \times 150 + 75 =$	525
Sunday:		0	0

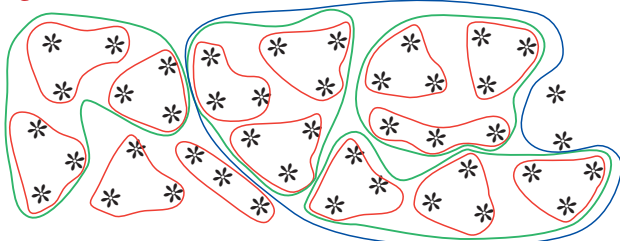
How many acorns did they collect altogether?

3825

1

- a) Group the elements by 3. Make groups of 3 by drawing around them in *red*.
Then draw in *green* around every 3 *red* groups.
Then draw in *blue* around every 3 *green* groups.

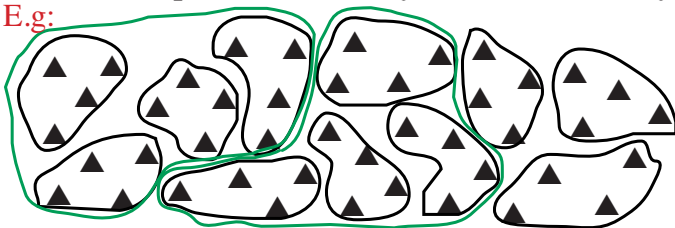
E.g: Write the number of different groups and the remainder in the table.



Number in each group	27	9	3	1
Number of groups	1	1	2	2

- b) Group the elements by 4 in a similar way. Fill in the table.

E.g:



Number in each group	16	4	1
Number of groups	2	3	0

2

This **tally chart** shows the months in which 37 pupils in a class were born.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	3	3	0	4	1	6	3	5	3	4	3

- a) Write the number of pupils in the bottom row of the table.

- b) Draw a graph about the data.

- c) Put the data in order.

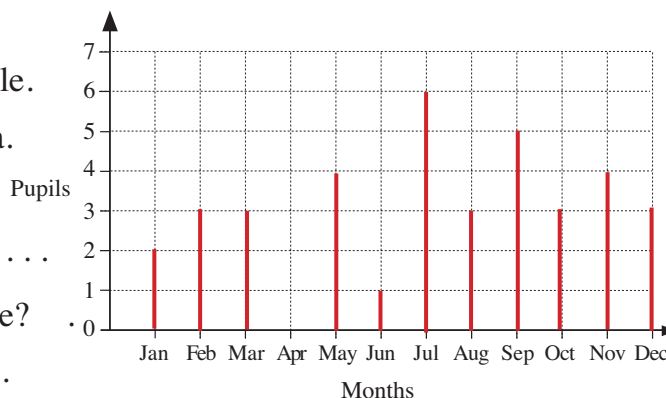
0, 1, 2, 3, 3, 3, 3, 3, 4, 4, 5, 6

- d) Which data are in the middle?

3 and 3

- e) Think of another 37 people. Would this statement about them be certain, possible or impossible?

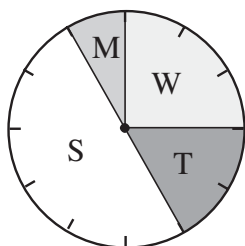
At least 4 people were born in the same month. **certain**

**3**

60 pupils were given a choice of 4 activities. How many pupils chose each one and what fraction of them chose it? Use the **pie chart** to complete the table.

Activities

M: Museum
W: Walking
T: Theatre
S: Sports



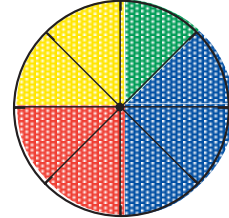
	M	S	T	W
No. of pupils	5	30	10	15
Fraction	$\frac{1}{12}$	$\frac{6}{12} = \frac{1}{2}$	$\frac{2}{12} = \frac{1}{6}$	$\frac{3}{12} = \frac{1}{4}$

1

4 children, $\frac{1}{8}$ of the class, have a *green* school bag and $\frac{3}{8}$ of the class have a *blue* bag. 8 children have a *red* bag and the rest have *yellow* bags.

Colour the pie chart to show the data. Complete the table.

Colour of bag	Green	Blue	Red	Yellow	Total
No. of pupils	4	12	8	8	32
Fraction	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{2}{8}$	$\frac{2}{8}$	$\frac{8}{8}$

**2**

A chain of supermarkets made a **pictogram** of how many pies they had sold in a year. Each pie on the diagram means 1000 real pies.

January:	3000	July:	2750
February:	4000	August:	2000
March:	3500	September:	2500
April:	4250	October:	3250
May:	3500	November:	4750
June:	3000	December:	4125

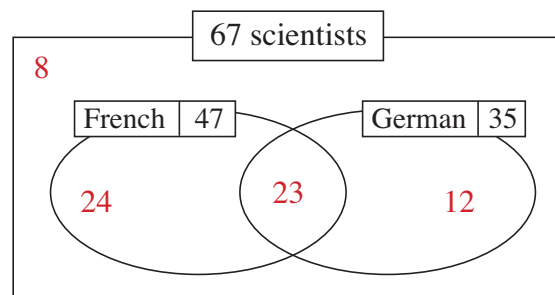
- Fill in the missing numbers and draw pies to show the numbers given.
- Write the data in increasing order. ... 2000, 2500, 2750, 3000, 3000, ...
... 3250, 3500, 3500, 4000, 4125, 4250, 4750 ...
- What is the difference between the 1st and last numbers? ... 2750 ...
- Underline the two middle numbers. Which number is half-way between them? This is the **median**. ... 3375 ...

3

67 scientists are at a conference.
47 speak French, 35 speak German
and 23 speak both languages.

How many of them speak neither
French nor German?

Complete the **Venn** diagram.

**4**

How many dictionaries would be needed to translate among these languages:
English, German, French, Spanish?

Answer: Either 12 or 6 if dictionary is a reverse

1

- a) Continue the list of 3-digit natural numbers with decreasing digits (to 500).
210; 310, 320, 321; 410, **420, 421, 430, 431, 432**
- b) Calculate the difference between the smallest and the greatest. **222**
- c) Which are the two middle numbers?**410**... and **420**

2

Jack is in training for a marathon.

These were the distances he ran every day last week.

Monday: 2800 m

Tuesday: 4300 m

Wednesday: 3500 m

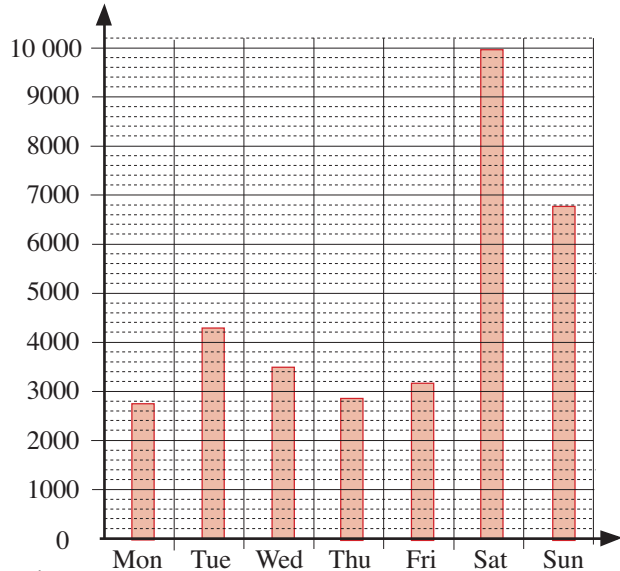
Thursday: 2.9 km

Friday: 3200 m

Saturday: 10 km

Sunday: 6800 m

Distance run (m)



- a) Show the data in a graph.
- b) List the distances in increasing order.
2800 m, 2900 m, 3200 m, 3500 m, 4300 m, 6800 m, 10 000 m
- c) What is the difference between the smallest and greatest distance? **7200 m** ..
- d) What is the **median** (the middle number)? **3500 m**

3

Among 67 scientists at a conference,

47 speak French,

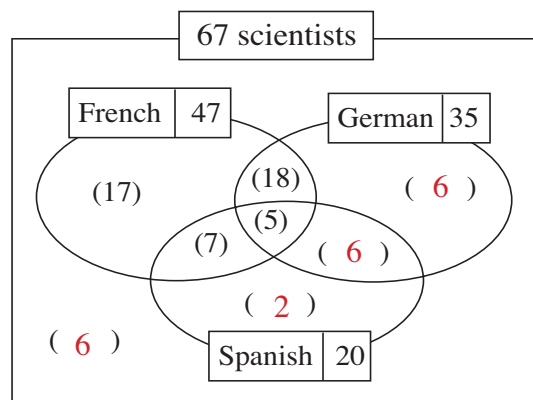
35 speak German,

20 speak Spanish,

12 speak French and Spanish,

11 speak German and Spanish,

5 speak all three languages.

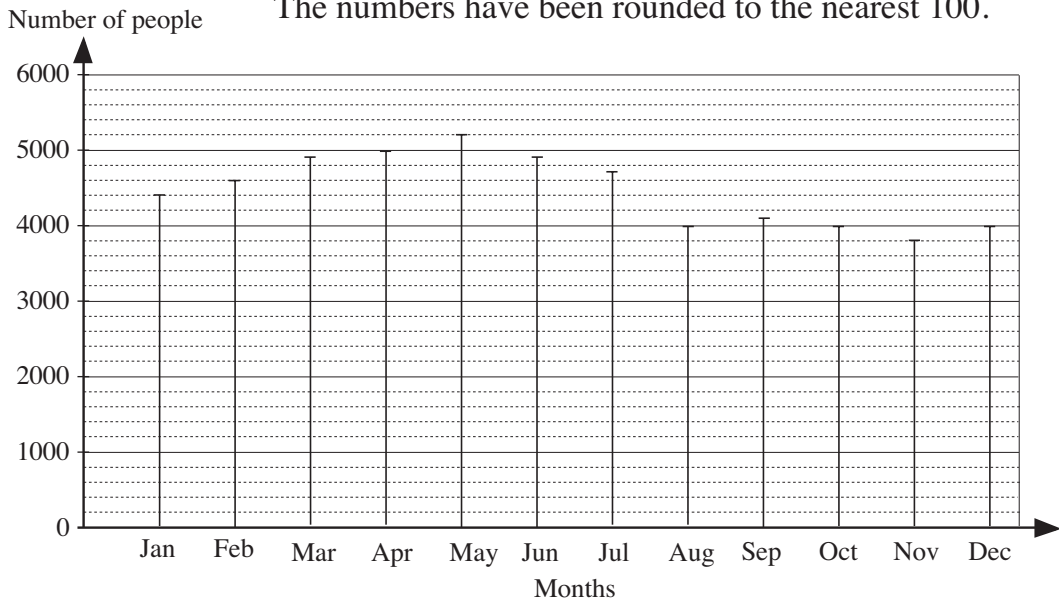


- a) Complete the *Venn* diagram.
- b) How many scientists speak:
- i) only French **17** ii) only German **6** iii) only Spanish? **2**
- c) How many scientists speak Spanish and German but not French? **6**
- d) How many scientists speak neither Spanish nor German nor French? **6**

1

The graph shows how many people saw a certain play in each month over a year.

The numbers have been rounded to the nearest 100.



Read the data from the graph and fill in the table.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. of people	4400	4600	4900	5000	5200	4900	4700	4000	4100	4000	3800	4000

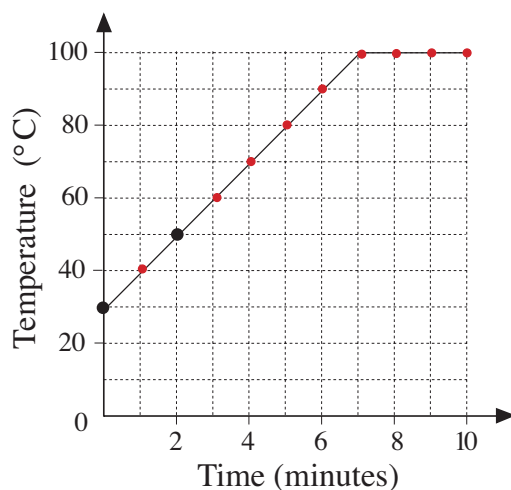
2

We heated a pan of water and noted its temperature every minute.

The temperature of the water rose steadily to 100°C , but did not go above it.

a) Complete the table.

Time (minutes)	0	1	2	3	4	5	6	7	8	9	10
Temperature ($^{\circ}\text{C}$)	30	40	50	60	70	80	90	100	100	100	100



b) Continue drawing dots in the graph to show the data.

c) By how many $^{\circ}\text{C}$ does the temperature rise each minute before it reaches 100°C ?

10 $^{\circ}\text{C}$

d) When does the temperature reach 100°C ?

after 7 mins

e) Is it correct to join up the dots?

Yes

3

There are 5 people at a party. Each person clinks glasses with each of the others. How many clinking of glasses will there be?

Work it out in your exercise book and write the answer.



$$4 + 3 + 2 + 1$$

10

1

Sammy Snail climbed up the wall at a steady speed. You can read from the table where he got to in the first 4 minutes.

Time (minutes)	0	1	2	3	4	5	6	7	8	9
Height (cm)	0	12	24	36	48	60	45	30	15	0

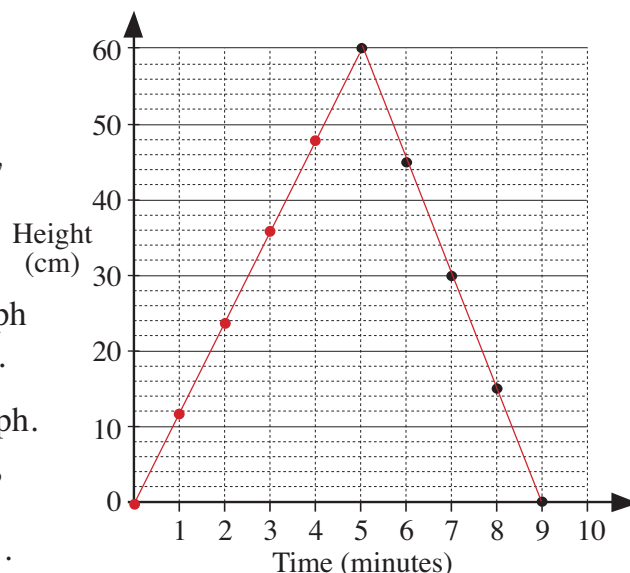


At the end of the 5th minute, *Sammy* turned and went back down the wall, again at a steady speed.

This time you can read from the graph where he got to in the last 5 minutes.

- Complete the table and the graph.
- Is it correct to join up the dots?

...Yes - time can have intervals...

**2**

We ran water from a tap into a jug shaped like a cylinder and noted the water level at certain times.

We found that the relationship between the time and the water level is $w = 2 \times t$ (where w is the water level in cm and t is the time in seconds).

- Fill in the table using this rule.

t	0	1	2	3	4	5	6	7	8	9	10
w	0	2	4	6	8	10	12	14	16	18	20

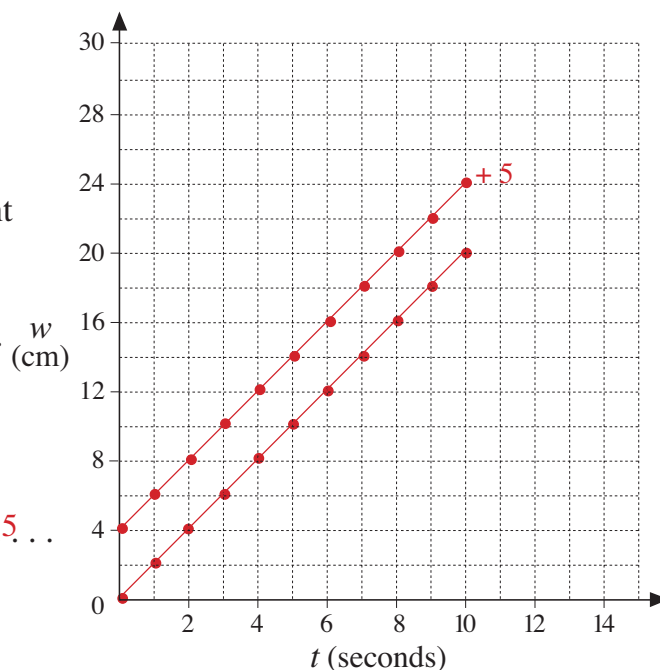
- Draw a graph by drawing dots on this grid and then joining them up.

- We did the same experiment another day but this time the jug already had 5 cm of water in it when we started.

Draw a table in your exercise books to show the new set of data.

Write the rule. $w = 2 \times t + 5$

Draw its graph line on this grid in red.



1

Find different rules to complete the table. Write each rule in different ways.

a)

a	20	200	2000	1260	1400	70	2470	8970
b	50	230	2030	1290	1430	100	2500	9000

Rule: $b = a + 30$ $a = b - 30$ $b - a = 30$

b)

x	20	200	2000	1260	1400	40	1000	3600
y	50	500	5000	3150	3500	100	2500	9000

Rule: $y = x \div 2 \times 5$ $x = y \div 5 \times 2$

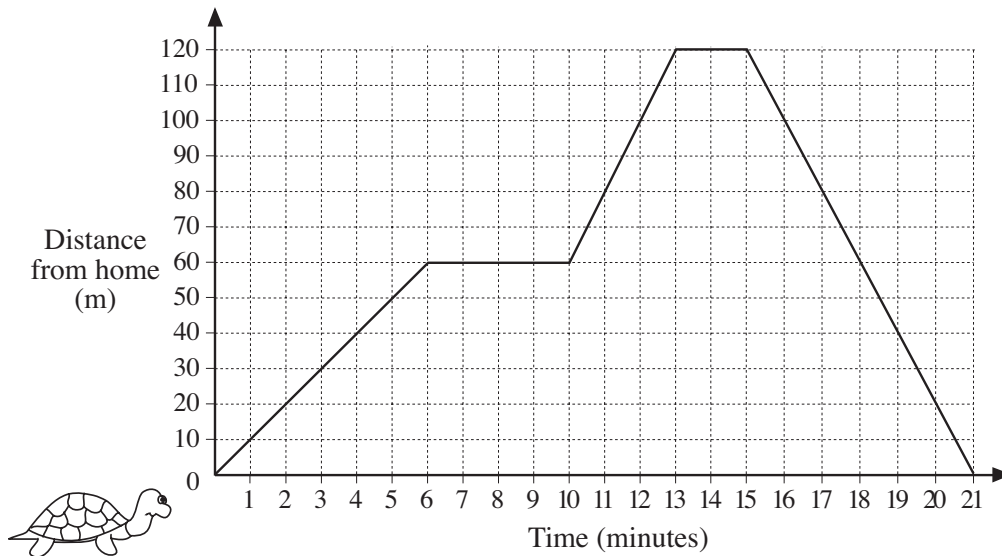
c)

u	20	200	2000	1260	1400	120	4920	17 920
v	50	140	1040	670	740	100	2500	9000

Rule: $v = u \div 2 + 40$ $u = (v - 40) \times 2$

2

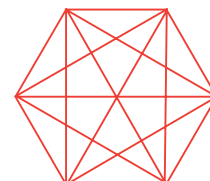
Tammy Tortoise went for a walk from her house to the field and back again. The graph shows how far she was from home during that time.



- a) How far away from home did *Tammy* go? **120 m**
- b) For how long was she away from home? **21 minutes**
- c) When did she start her return journey? **after 15 minutes**
- d) How many times did *Tammy* stop to rest? **twice**

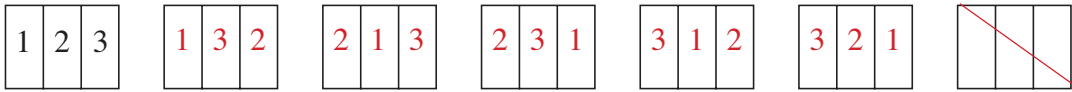
3

How many diagonals does a **hexagon** have?
Show it by drawing a hexagon and its diagonals.

**9 diagonals**

1

If we put a 3-volume encyclopedia back on the shelf without looking at the volume numbers, in what order might they end up? Show all the possibilities.



- a) What chance is there of them being in the order 2 3 1? $\dots \frac{1}{6} \dots$
- b) What chance is there of these events happening?
- i) The book on the left-hand side is *Volume 1*. $\dots \frac{2}{6} \dots$
- ii) The volume numbers are decreasing from the left. $\dots \frac{1}{6} \dots$

2

Four children are playing a game with these cards. 0 1 2 3 4 5

Rules of the game

- Player 1* shuffles the cards, then lays them out face down on the table.
- Player 2* picks 2 cards and turns them face up. The first card is the tens digit and the 2nd card is the units digit.
Player 2 notes down his number. e.g. 0 and 3 \rightarrow 03
- Player 2* shuffles the cards for *Player 3* to choose a number, and so on.
- Each player keeps a running total of their numbers and the first one to reach 100 is the winner.

BUT the 4 children made up their own extra rules for their game.

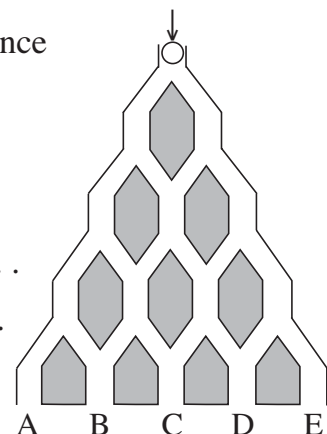
- Alan* misses a turn if the 2-digit number is even.
 - Becky* misses a turn if the 2-digit number is odd.
 - Callum* misses a turn if the 2-digit number is a whole 10.
 - Diana* misses a turn if the 2-digit number is divisible by 5.
- a) List in your exercise book all the 2-digit numbers that could be chosen.
(01, 02, 03, 04, 05) 10, 12, 13, 14, 15, 20, 21, 23, 24, 25, 30, 31, 32, 34, 35, 40, 41, 42, 43, 45,
- b) Who might complain because the extra rules are unfair? \dots 50, 51, 52, 53, 54
All but Callum might complain as he has the least chance of missing a turn.

3

A marble is dropped into this maze and has an equal chance of falling to the left or to the right.

- a) In how many ways can the marble come out at:
A .1. B .4. C .6. D .4. E .1.?
- b) Where is the marble most likely to come out? \dots C \dots
- c) Write the ratio of the chance of where it comes out.

A B C D E
1 : 4 : 6 : 4 : 1



1

Three boys, A, B and C, decided to have a race. We know that there was a tie but not for which place.

- a) What could the finishing order be? Show all the possibilities.

1st	2nd/3rd	1st/2nd	3rd	1st / 2nd / 3rd
A	B C	A, B	C	A, B, C
B	A C	A, C	B	
C	A B	B, C	A	

- b) If each possible result has an equal chance of happening, what is the chance that there was a tie for 1st place? $\frac{4}{7}$

2

Predict the results for each outcome first, then do the experiment.

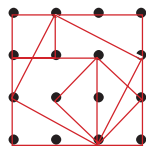
Put 2 *red*, 2 *white* and 2 *green* counters in a bag. Shake the bag to mix the counters, then close your eyes and take out 2 counters. Note the colours and put the counters back in the bag.

Repeat the experiment 15 times and note the results in this table.

E.g: Outcome	Prediction	Experiment															Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Both the same	7																4
Both different	8																11
1 red + 1 white	2																1
2 green	1 ✓																1

What chance is there of you taking out of the bag:

- a) 2 counters of the same colour $\frac{4}{15}$
- b) 2 counters of different colours $\frac{11}{15}$
- c) a *red* and a *white* counter $\frac{1}{15}$
- d) 2 *green* counters? $\frac{1}{15}$

3

How many squares which have vertices on the grid dots can you draw on this diagram?

Try it out in your exercise book. Answer: 20 squares

4

Which digits can be the last digits of the **square** numbers? Continue the list $1 \times 1 \rightarrow \underline{1}$, $2 \times 2 \rightarrow \underline{4}$, $3 \times 3 \rightarrow \underline{9}$, $4 \times 4 \rightarrow \underline{6}$, ... in your exercise book.

$5 \times 5 \rightarrow \underline{5}$, $6 \times 6 \rightarrow \underline{6}$, $7 \times 7 \rightarrow \underline{9}$, $8 \times 8 \rightarrow \underline{4}$, $9 \times 9 \rightarrow \underline{1}$, $10 \times 10 \rightarrow \underline{0}$, $11 \times 11 \rightarrow \underline{1}$

Is it true or false that in 7 different square numbers there are at least 2 in which:

- a) the units digits are the same T b) their difference is divisible by 10? T

1

Predict the results for each outcome first, then do the experiment.

Toss 2 coins one after the other 20 times and note how they land in this table.

E.g:

E.g.

Outcome	Prediction	Tosses																				Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
2 Heads	6																					5
1 Head + 1 Tail	3																					5
1 Tail + 1 Head	4✓																					4
2 Tails	7																					6

What **fraction** of the tosses resulted in:

- a) 2 heads b) 2 tails c) a head and a tail d) at least 1 head?

 $\frac{5}{20}$
 $\frac{6}{20}$
 $\frac{9}{20}$
 $\frac{14}{20}$
2

At the entrance to a wood there are 5 paths leading to the first clearing.

From the first clearing there are 6 paths leading to the 2nd clearing.

From the 2nd clearing there are 3 paths leading to the 3rd clearing.

 $5 \times 6 \times 3 = 90$

- a) Draw a diagram to show it in your exercise book.
- b) How many routes could you take from the 1st clearing to the 3rd clearing? 6×3
- c) What chance would you have of guessing correctly a person's route from the entrance of the wood to the 3rd clearing?

 18
 $\frac{1}{90}$







$$5 \times 6 \times 3 = 90$$

3

Predict the results for each outcome first, then do the experiment.

Throw a dice 20 times and keep a tally of how it lands in this table.

E.g:

	Prediction	Tally of 20 throws	Totals
	4		4
	4		3
	4		3
	4		3
	3		5
	3		2

How many times did you get: a) a 2 **or** a 3 .6... b) less than 5 .13..

c) not less than 5 .7... d) not more than 6 .20... e) more than 6? .0...

1

Throw 2 dice at the same time 36 times. Keep a tally of the outcomes here.

E.g.:

1 and 1	
1 and 2	
1 and 3	
1 and 4	
1 and 5	
1 and 6	

2 and 2	
2 and 3	
2 and 4	
2 and 5	
2 and 6	

3 and 3	
3 and 4	
3 and 5	
3 and 6	

4 and 4	
4 and 5	
4 and 6	

5 and 5	
5 and 6	

6 and 6	
---------	--

- a) How many times were these numbers the **product** of the 2 numbers thrown?

1	2	3	4	5	6	8	9	10	12	15	16	18	20	24	25	30	36
1	2	1	4	3	4	2	1	2	5	2	0	1	3	1	2	1	1

- b) How many times was the product of the 2 numbers even?
What fraction is it of the 36 throws?

26

$\frac{26}{36}$

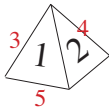
- c) How many times were these numbers the **sum** of the 2 numbers thrown?

1	2	3	4	5	6	7	8	9	10	11	12	13
0	1	2	3	4	6	7	4	4	3	1	1	0

- d) How many times was the sum of the 2 numbers even?
What fraction is it of the 36 throws?

18

$\frac{18}{36}$

2

Leslie threw a pyramid-shaped dice 100 times. It has 5 written on its square base and 1, 2, 3 and 4 written on its triangular sides.

Leslie made this table to show how many times (**frequency**) the dice landed on each number (**outcome**). We say that it shows the **frequency** of each **outcome**.

Outcome	1	2	3	4	5
Frequency	15	18	19	16	32
Probability	$\frac{15}{100}$	$\frac{18}{100}$	$\frac{19}{100}$	$\frac{16}{100}$	$\frac{32}{100}$

- a) Write in the bottom row of the table what **fraction** of the 100 times each number was landed on.

This is called the **probability** of an outcome happening.

- b) How many times did Leslie throw: i) at most a 3

52

ii) at least a 3?

67

3

T: Tails, H: Heads

Possible outcomes

10 p coin	T	T	T	H	T	H	H	H		
20 p coin	T	T	H	T	H	T	H	H		
50 p coin	T	H	T	T	H	H	T	H		

If we toss a 10 p, a 20 p and a 50 p coin at the same time just once, which sides could face up?

Write T or H in the table.

1

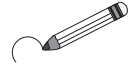
Calculate the product of the 7 smallest

- a) positive, even, whole numbers. $.2 \times 4 \times 6 \times 8 \times 10 \times 12 \times 14 = 645\,120 \dots$
- b) 1-digit numbers. $.0 \times 1 \times 2 \times 3 \times 4 \times 5 \times 6 = 0 \dots$

2

Circle the natural numbers up to 100 which have only two factors.

(e.g. the only factors of 7 are 7 and 1)



1 (2) (3) 4 (5) 6 (7) 8 9 10 (11) 12 (13) 14 15 16 (17) 18 (19) 20
 21 22 (23) 24 25 26 27 28 (29) 30 (31) 32 33 34 35 36 (37) 38 39 40
 (41) 42 (43) 44 45 46 (47) 48 49 50 51 52 (53) 54 55 56 57 58 (59) 60
 (61) 62 63 64 65 66 (67) 68 69 70 (71) 72 (73) 74 75 76 77 78 (79) 80
 81 82 (83) 84 85 86 87 88 (89) 90 91 92 93 94 95 96 (97) 98 99 100

We call these numbers **prime numbers**. List them in increasing order.

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, ...
 73, 79, 83, 89, 97, ...

3

Practise calculation.

a)

	6	0	4	7
	5	9	2	8
+		3	1	4
	1	2	2	8
				9

b)

	4	0	5	6
		3	9	2
+	1	0	0	7
	5	4	5	5

c)

	1	2	4	0	5
-		8	0	4	3
		4	3	6	2

d)

	5	9	2
-	1	3	7
	4	5	5

e)

	2	8	0	3
			×	6
	1	6	8	1
				8

f)

	9	9	9
		×	9
	8	9	9
			1

g)

		1	9	2	0	r 2
8	1	5	3	6	2	

h)

		6	1	5	r 4
7	4	3	0	9	

4

A cuboid is built from 20 unit cubes. We know that the lengths of its edges are whole units and more than 1 unit. Work out the answers in your exercise book.

- a) How long are its edges? $a = .2 \dots \dots \dots b = .2 \dots \dots \dots c = .5 \dots \dots \dots$
- b) What is its surface area in unit squares? $\dots 48 \text{ square units} \dots \dots \dots$

5

Tom has ducks and pigs on his farm, 8 in total. They have 22 legs altogether. How many ducks and how many pigs does Tom have?

Work out the answer in your exercise book.



5



3

a)	$2756 - 1348 + 220 =$	<div>1628</div>	$2756 - (1348 - 220) =$	<div>1628</div>
b)	$2756 \times 4 + 1348 \times 4 =$	<div>16416</div>	$(2756 + 1348) \times 4 =$	<div>16416</div>
c)	$(6315 - 1726) \times 3 =$	<div>13767</div>	$6315 \times 3 - 1726 \times 3 =$	<div>13767</div>
d)	$10\,256 \div 4 - 2372 \div 4 =$	<div>1971</div>	$(10\,256 - 2372) \div 4 =$	<div>1971</div>
e)	$2187 \div (9 \div 3) =$	<div>729</div>	$2187 \div 9 \div 3 =$	<div>81</div>
f)	$2187 \times 9 \div 3 =$	<div>6561</div>	$2187 \times (9 \div 3) =$	<div>6561</div>

2

a) In a large container there are 18 649 litres of water.
In a smaller container there are 12 450 litres less.
How much water is in the smaller container? .. ~~6199~~ litres ..

b) Andrew has £6278 and James has £2327 more.
How much money will James have left after spending £1796? ~~£6809~~ ..

c) A cruise to a certain holiday destination costs £875 per person.

i) How much would it cost for a group of 4 people? ~~£3500~~ ..

ii) How much would it cost for a group of 8 people? ~~£7000~~ ..

iii) How much would it cost for each group if they travelled by plane for £400 less each? 4: ~~£1900~~ .. 8: ~~£3800~~ ..

3

(You must keep the digits in increasing order!) $1 + 2 + 34 + 56 + 7 = 100 \dots\dots$
 $1 + 23 + 4 + 5 + 67 = 100$

4

A number line from 0 to 1 with tick marks every $\frac{1}{10}$. The points are labeled as follows:

Point	Label
0	0
1	$\frac{1}{10}$
2	$\frac{2}{10}$
3	$\frac{3}{10}$
4	$\frac{4}{10}$
5	$\frac{5}{10}$
6	$\frac{6}{10}$
7	$\frac{7}{10}$
8	$\frac{8}{10}$
9	$\frac{9}{10}$
10	1

Point A is located at the 2nd tick mark, labeled $\frac{1}{5} = \frac{2}{10}$. Point B is located at the 7th tick mark, labeled $\frac{7}{10}$.

5

a) $\text{CLXXXVI} \div \text{III} = \text{LXII}$ ✓
 $186 \div 3 = 62$

b) $\text{MMII} - \text{MCMXCIX} = \text{V}$ ✗
 $2002 - 1999 = 5$ ✗
 $2002 - 1999 = 3 = \text{III}$

1

In your exercise book, write 2-term additions using the numbers in *Set A*.

$$A = \{-3, 2, 1, 0, -5, 6\}$$

a) How many different additions are possible? **15**

b) How many of the results are: i) positive **8** ii) negative? **7**

2

Solve this problem in your exercise book. Write only the answer here.

If my father takes 20 paces forward, he covers a distance of 16 m.

If I take 10 paces forward, I cover a distance of 7 m.

How much longer is one of my father's paces than one of mine? **10 cm**

3

The price of 0.7 litres of syrup is £5.60. How much would 1 litre of syrup cost?

..... **£8.00**

4

$$8 = 2 \times 4 \text{ and } 8 + 4 = 12 \text{ is exactly divisible by 3, as } 3 \times 4 = 12$$

$$14 = 2 \times 7 \text{ and } 14 + 7 = 21 \text{ is exactly divisible by 3, as } 3 \times 7 = 21$$

Is this statement true or false? Give a reason for your answer.

If we add a natural number and its double, then the sum is exactly divisible by 3.

..... **$x + 2x = 3x$ Yes, divisible by 3**

.....

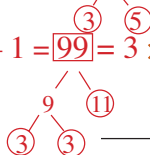
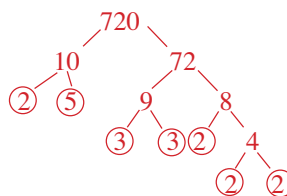
5

Factorise these numbers.

a) $720 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$

b) $8 \times 8 - 7 \times 7 = 64 - 49 = 15 = 3 \times 5$

c) $10 \times 10 - 1 = 100 - 1 = 99 = 3 \times 3 \times 11$

**6**

a) Factorise 1250 and 175 in your exercise books.

What is: i) the greatest ii) the smallest

natural number which is a factor of both numbers? i) **25** ii) **1**

b) Factorise 68 and 170 in your exercise books.

What is: i) the greatest ii) the smallest

natural number which is a factor of both numbers? i) **34** ii) **1**

$$1250 = 2 \times 5 \times 5 \times 5 \times 5$$

$$175 = 5 \times 5 \times 7$$

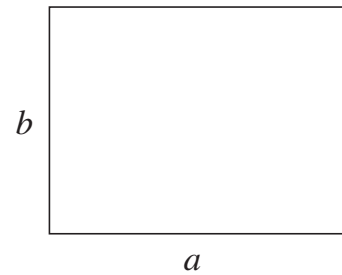
$$68 = 2 \times 2 \times 17$$

$$170 = 2 \times 5 \times 17$$

1

The rectangle is the plan of a garden. 1 mm on the diagram means 1 m in real life. Measure the sides and complete the table.

	<i>On diagram</i>	<i>In real life</i>
Side a	40 mm	40 m
Side b	30 mm	30 m
Perimeter	140 mm	140 m
Area	1200 mm ²	1200 m ²

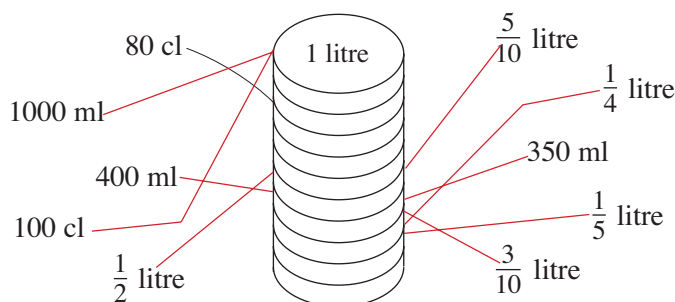
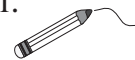
Scale: 1 mm \rightarrow 1 m**2**

The square is the plan of a table. 1 mm on the diagram means 3 cm in real life. Measure a side and complete the table.

	<i>On diagram</i>	<i>In real life</i>
Side a	30 mm	90 cm
Perimeter	120 mm	360 cm
Area	900 mm ²	8100 cm ²

Scale: 1 mm \rightarrow 3 cm**3**

On the outside of a measuring cylinder, there are marks at every 10 cl. Join up the quantities to the corresponding marks.

**4**

Change the units of measure, then round them to the nearest whole unit required.

- a) i) 678 m = km m \approx km
 ii) 15 240 m = km m \approx km
 iii) 5648 mm = m mm \approx m
- b) i) 3518 ml = litres ml \approx litres
 ii) 3518 cl = litres cl \approx litres
 iii) 18 450 ml = litres ml \approx litres

1

A gang of workmen repaired 5 km 300 m of road in the 1st week of March, 8 km 60 m in the 2nd week and 4 km 700 m in the 3rd week.

What length of road did the gang repair in the 3 weeks?

18 km 60 m

2

There were 5 litres 400 ml of syrup in a container. Another 680 ml were poured in. How much syrup is in the container now?

6 litres 80 ml

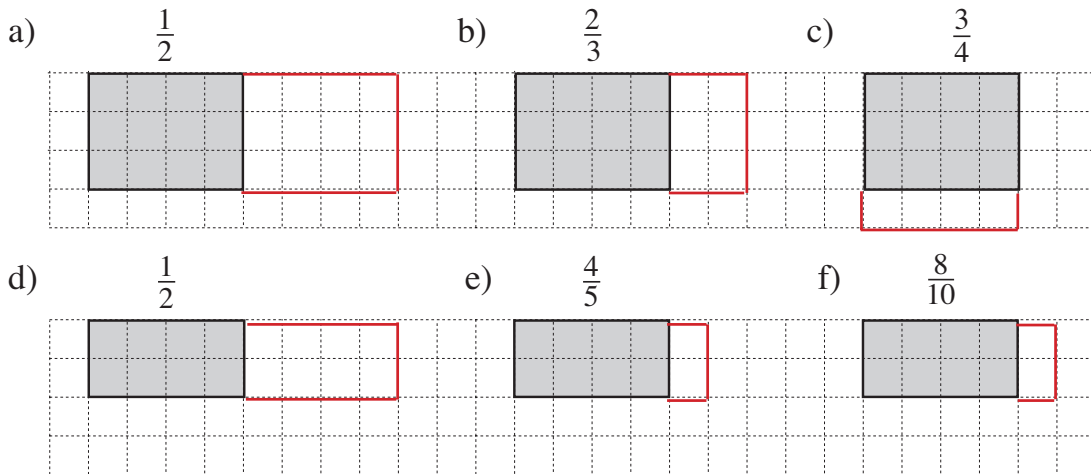
3

In a granary, there are 14 650 kg of grain. 8750 kg is wheat, 230 kg is rye and the rest is oats. How many kg of oats are in the granary?

5670 kg

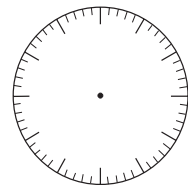
4

Draw around the whole rectangle if the shaded area is:

**5**

Fill in the missing numbers.

1 hour = 60 minutes



- | | |
|--|---|
| a) $\frac{1}{4}$ hour = 15 minutes | $\frac{3}{4}$ hour = 45 minutes |
| b) 0.5 hour = 30 minutes | 0.7 hour = 42 minutes |
| c) $\frac{1}{3}$ hour = 20 minutes | $\frac{2}{3}$ hour = 40 minutes |
| d) $\frac{1}{6}$ hour = 10 minutes | $\frac{5}{6}$ hour = 50 minutes |
| e) $\frac{1}{5}$ hour = 12 minutes | 0.6 hour = 36 minutes |

1

Do the calculations in your exercise book. Write the answers here.

- a) 1 m of material costs £6.70. How much do 8 m cost?

£53.60

- b) 7 kg of apples cost £13.30. How much does 1 kg cost?

£1.90

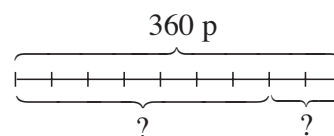
- c) 5 litres of oil cost £16.50. How much do 7 litres cost?

£23.10**2**Kate had 360 pennies. On Friday she spent $\frac{7}{9}$ of them on stamps.

- a) How much did the stamps cost?

280 p

- b) What part of her money was left?

 $\frac{2}{9}$ **3**Danny has already run 900 m, which is $\frac{3}{5}$ of the distance he has to run.

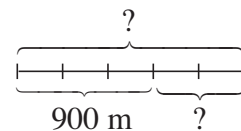
- a) What distance is he running?

1500 m

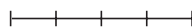
- b) i) What part of the distance does he still have to run?

 $\frac{2}{5}$

- ii) How many metres does he still have to run?

600 m**4**

- a) How much does Peter have if
- $\frac{1}{2}$
- of his money is 50 p more than
- $\frac{1}{4}$
- of it?

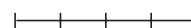
**£2**

- b)
- $\frac{2}{5}$
- of Veronica's money is 120 p less than
- $\frac{3}{5}$
- of it.

How much money does Veronica have?

£6

- c) Wendy spent half of her money on Monday, half of what was left on Tuesday and she had 40 p left.



How much money did Wendy have at first?

£1.60**5**

Solve the equations and inequalities in your exercise book.

a) $3 \times a - 410 = 4690$

b) $4 \times b + 40 = 3 \times b + 110$

c) $5 \times c + 2000 < 7400$

d) $87 < 6 \times d - 320 < 113$

$$\begin{aligned} 3a &= 4690 - 410 \\ a &= 5100 \\ a &= 1700 \end{aligned}$$

$$\begin{aligned} 4b - 3b &= 110 - 40 \\ b &= 70 \end{aligned}$$

$$\begin{aligned} c &< 7400 - 2000 \div 5 \\ c &< 1080 \end{aligned}$$

$$\begin{aligned} d: & 68, 69, 70, \\ & 71, 72 \end{aligned}$$

when d is a natural number

1

What rule has been used to group the natural numbers?

5, 25, 100, 10, 75, 975, 570	1, 6, 21, 1201, 66, 96, 61, 831	2, 7, 42, 5317, 72, 87, 172, 657	3, 8, 63, 4218, 38, 13, 648, 903	4, 9, 99, 1644 54, 49, 359, 184
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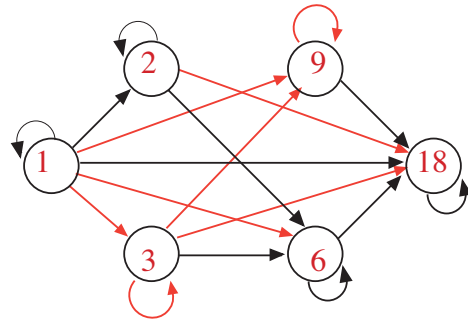
Write these numbers in the correct set.

10, 72, 38, 13, 54, 96, 61, 87, 75, 49, 172,
359, 648, 975, 831, 570, 903, 184, 657

2

Write the numbers 1, 2, 3, 6, 9 and 18 in the suitable circles if the arrows point towards the multiples.

Complete the missing arrows.

**3**


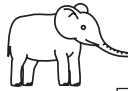

It takes 45 minutes for 7200 litres of water to flow out of the dam.

How much water would flow out after these times? Fill in the missing numbers.

- a) 15 minutes: litres b) 5 minutes: litres
 c) 3 minutes: litres d) 1 minute: litres
 e) 30 minutes: litres f) 1 hour: litres

4

Solve the problems in your exercise book. Write only the answer here.

- a) *Lennie Lion* eats about 16 kg of meat every day. 
 About how much meat does *Lennie Lion* eat in a year?
- b) In one year, *Ellie Elephant* drinks about 150 times. 
 Each time, she drinks about 200 litres of water.
 How much water does *Ellie Elephant* drink in a year?
- c) *Daisy Dragonfly* flies around for 2 and a half hours. 
 How far does she fly if she covers 625 m per minute?

1

Solve the problems in your exercise book.

- a) A point on the Equator turns on the Earth's axis at a speed of 465 m per second. How many metres does it turn every minute? **27900 m**

- b) During a thunderstorm, 30 mm of rain fell. It means that 30 litres of rain fell on an area of 1 square metre.

After the same thunderstorm, how many litres of rain fell on a rectangular garden which is 30 m wide and 50 m long? **45000 litres**

- c) 1 centimetre cube of gold has mass 19.3 g. What would be the mass of a cuboid made of gold if it is 20 cm long, 10 cm wide and 9 cm high?

34 kg 740 g**2**

Practise calculation.

a)

1	2	4	3	5
+	3	0	7	2
1	5	5	0	7

b)

2	3	4	0	8
-	1	0	5	0
1	2	9	0	1

c)

	8	2	5	3
			×	8
6	6	0	2	4

d)

		4	7	0	3
6	2	8	2	1	8

e)

1	0	9	5	6
			×	7
7	6	6	9	2

f)

8	7	4	3	0
-	2	3	5	1
6	3	9	2	0

g)

2	6	1	0	0
			×	3
7	8	3	0	0

h)

		9	7	6	7
9	8	7	9	0	3

3

List the natural numbers about which this statement is true.

It is a multiple of 8, the sum of its digits is 7 and the product of its digits is 6.

16

.....

4

Three travellers met on a road. One of them had 3 loaves of bread, another had 5 loaves of bread and the third had no food at all. They shared the bread equally.

The third person then offered 8 coins to the others to pay for his food.

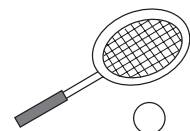
How can the other two travellers share the money fairly?

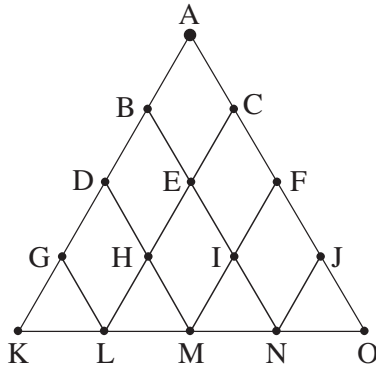
Bread*Coins***5**

27 players took part in a knockout singles tennis competition.

The winner from each pair went through to the next round and the person without an opponent qualified automatically.

How many matches were played before the winner was decided?

**26**

1

How many routes lead from A to K, L, M, N and O if you can only move down to the left or to the right?

A to K : ABDGK

A to L : ABDGL, ABDHL, ABEHL, ACEHL

A to M : ABDHM, ABEHM, ABEIM, ACEHM, ACEIM, ACFIM

A to N : ABEIN, ACEIN, ACFIN, ACFJN

A to O : ACFJO

2

Colour the shapes on the grid and fill in the missing numbers if the sum of the numbers in each shape is 10 000.

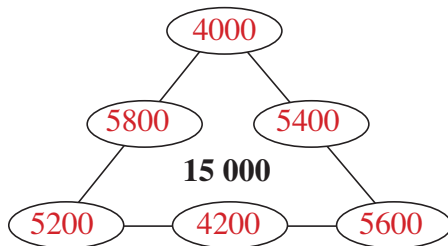
4000	2900	3500	1700	2800	1700
3100	2600	5100	2000	4300	4200
4400	2700	9300	1000	1200	5800
3500	1400	2300	2600	2800	3900

4000	2900	3500	1700	2800
3100			2000	
2700		1000		4200
1400	2300	2600		5800

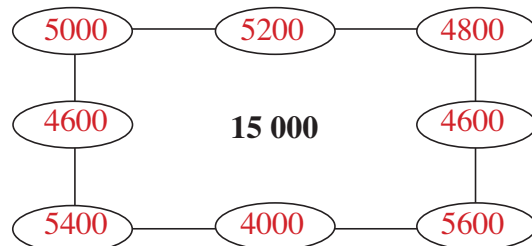
3

Write the missing numbers in the puzzles if the sum of the 3 numbers along each side is 15 000. Choose from:

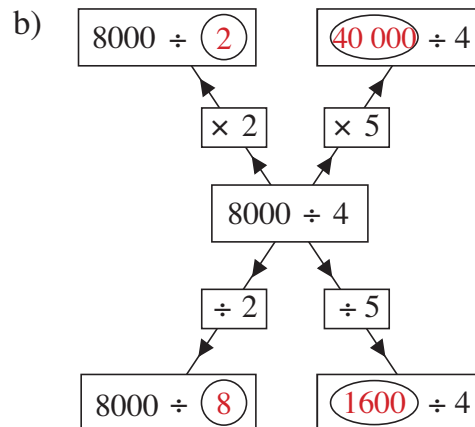
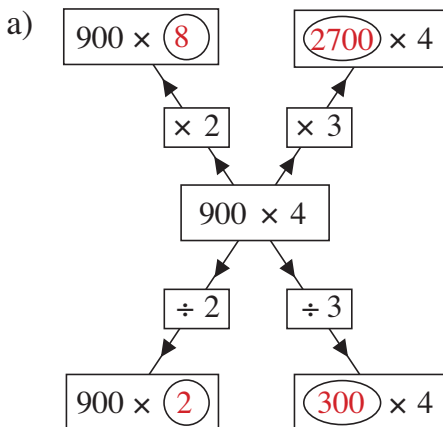
- a) 4200, 4000, 5200, 5400, 5600, 5800



- b) 5400, 5600, 5800, 4800, 5000, 5200, 4000, 4600

**4**

Fill in the missing numbers.



1

- a) List the natural numbers up to 100 which have an odd number of factors.

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

- b) What are these numbers called? **Square numbers**

2

- a) How many zeros are at the end of the number which is the result of

$$10 \times 11 \times 12 \times 13 \times 14 \times 15?$$

3 603 600

- b) Check your answer on a calculator. Write the product in words.

2

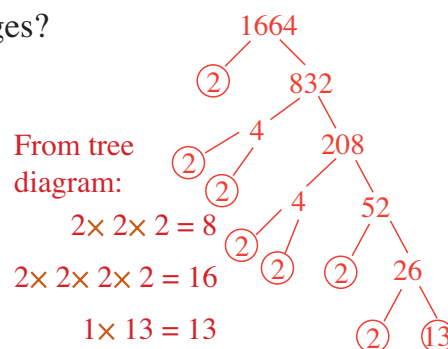
Three million, six hundred and three thousand and six hundred

3

The product of the ages of my children is 1664. The youngest is half the age of the oldest. I am 50 years old.

How many children do I have and what are their ages?

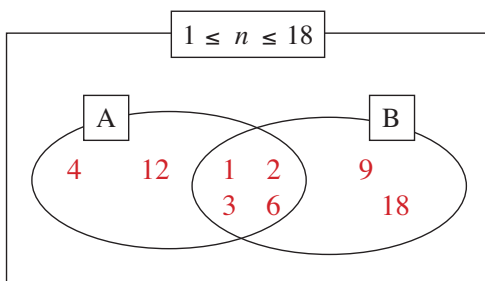
3 children aged are 8, 16 and 13 years

**4**

Two positive whole numbers have these factors in common: 1, 2, 3 and 6.

If we combine their factors we get this set:

$\{1, 2, 3, 4, 6, 9, 12, 18\}$.



Write the factors in the correct set if:

A = {factors of the 1st number}

B = {factors of the 2nd number}

What are the two numbers?

12 and **18**

5

List the positive integers up to 100 which are exactly divisible by 2, 3, 4, and 5.

.....

..... **60**

6

I am thinking of a positive number.

Its half is 15 more than its third and its quarter is

15 more than its sixth. What is the number?

Not possible - see Lesson Plan for explanation.

**7**

In how many different orders can you put these shapes?



30

1

The perimeter of a triangle is 10 cm and the length of each side is a whole cm. Are these statements true or false? Write a ✓ if true and a ✗ if false.

- a) The triangle has only one side which is 1 cm long. ✗
- b) The triangle could have only one side which is 2 cm long. ✓
- c) The triangle has only one side which is 3 cm long. ✗
- d) The triangle has only one side which is 5 cm long. ✗

2

We want to rearrange some books on two bookshelves.

At the moment, there are 156 books on the bottom shelf and on the top shelf there are 30 books more than there are on the bottom shelf.

Rearrange the books so that there are:

- a) the same number of books on both shelves **171** .. and .. **171** ..
- b) one shelf has twice as many books as the other. **114** .. and .. **228** ..

3

The children are making up gift boxes for a large party.

- a) If they put 4 sweets in each box, they can make 139 boxes and 2 sweets will be left over. How many sweets did they have?

Answer **558 sweets**

- b) How many gift boxes would they make if they put 9 sweets in each box?

Answer **62 gift boxes**

4

Three children in a family made a flower garden, 6 m wide and 12 m long.

David said that he would look after 3 times more of it than his younger sister, Ann. George, who was the eldest, said that he would work on as much of the garden as his brother and sister together.

What area of the garden did each child take care of?

D: ... **27 m²** A: ... **9 m²** G: ... **36 m²**

1

Sue spent half of her money. Then she spent another £20 and had £80 left.
How much money did Sue have at first?

Answer: ... **£200**

2

Which positive integer can be written instead of the letter x so that the inequality is true?

$$48 + x < 52 - x$$

$$x = \boxed{1}$$

3

An antiques dealer bought a vase for £700, then sold it for £800.
Then he bought the vase back again for £900 and sold it for £1000.
Did the antiques dealer make a profit or a loss?



Answer: ... **profit of £200**

4

What is half of double the greatest 2-digit number?

99

5

On a sheet of paper there are these 4 statements. Tick the only true one.

1. On this sheet there is exactly one false statement.
 2. On this sheet there are exactly two false statements.
 - ✓3. On this sheet there are exactly three false statements.
 4. On this sheet there are exactly four false statements.

6

At the market in *Hobbitland*, they offered 4 roosters for 2 geese or 2 roosters for 4 chickens.

How many roosters did *Mrs Hobbit* get for 1 goose and 2 chickens?

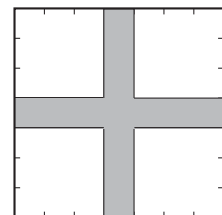
Answer: ... **3 roosters**

7

We want to cut out a cross from a square piece of material which has sides of length 7 cm.

The width of each arm of the cross is 1 cm.

How much material will be wasted?



Answer: ... **36 cm² wasted**